

**What is claimed is:**

- 1                   1.       A method of preparing cellulose ethers comprising the steps of:  
2                   (a)     obtaining mercerized and recovered cellulose pulp; and  
3                   (b)     converting the mercerized and recovered cellulose pulp into  
4   the cellulose ethers,  
5   wherein the mercerized cellulose pulp in step (a) was mercerized with a cellulose II  
6   mercerizing agent, the cellulose pulp is southern softwood kraft, the mercerized and  
7   recovered cellulose pulp has a TAPPI 230 om-89 viscosity of at most 12 cP, and when the  
8   cellulose ether prepared is hydroxyethyl cellulose, the mercerized and recovered cellulose  
9   pulp has at least one of the following properties:  
10               (i)     a TAPPI 230 om-89 viscosity less than 10.4 cP or greater than 11.2 cP,  
11               (ii)     a solubility in 10% sodium hydroxide as determined by ASTM D 1696-95  
12   of greater than 2.3%,  
13               (iii)    a solubility in 18% sodium hydroxide as determined by ASTM D 1696-95  
14   of greater than 1.3%,  
15               (iv)    not been prehydrolyzed, or  
16               (v)     not been bleached with elemental chlorine.

- 1                   2.       The method of claim 1, wherein the cellulose ether prepared is  
2   hydroxyethyl cellulose and the mercerized and recovered cellulose pulp has a TAPPI 230  
3   om-89 viscosity less than 9.25 cP.

- 1                   3.       The method of claim 2, wherein the cellulose ether prepared is  
2   hydroxyethyl cellulose and the mercerized and recovered cellulose pulp has a TAPPI 230  
3   om-89 viscosity less than 8 cP.

- 1                   4.       The method of claim 1, wherein the mercerized and recovered  
2   cellulose pulp has a TAPPI 230 om-89 viscosity less than 9.25 cP.

- 1                   5.       The method of claim 4, wherein the mercerized and recovered  
2   cellulose pulp has a TAPPI 230 om-89 viscosity less than 8 cP.



1                    21.     The method of claim 1, wherein the mercerized and recovered  
2     cellulose pulp is substantially free of cellulose III.

1                   22.     The method of claim 1, wherein the mercerized and recovered  
2 cellulose pulp contains less than about 3.5% by weight of mercerizing agent, based upon  
3 100% by weight of cellulose pulp and mercerizing agent

1                   23.     The method of claim 22, wherein the mercerized and recovered  
2 cellulose pulp contains less than about 0.3% by weight of mercerizing agent, based upon  
3 100% total weight of cellulose pulp and mercerizing agent.

1                   24.     The method of claim 23, wherein the mercerized and recovered  
2 cellulose pulp contains less than about 0.03% by weight of mercerizing agent, based upon  
3 100% total weight of cellulose pulp and mercerizing agent.

1                   25.     The method of claim 1, wherein the mercerized and recovered  
2 cellulose pulp has an Rx value of greater than 0.57.

1                   26.     The method of claim 25, wherein the mercerized and recovered  
2 cellulose pulp has an Rx value of greater than 0.60.

1                   27.     The method of claim 26, wherein the mercerized and recovered  
2 cellulose pulp has an Rx value of greater than 0.64.

1                   28.     The method of claim 1, wherein the mercerized and recovered  
2 cellulose pulp has at least about 20% by weight of cellulose II, based upon 100% total  
3 weight of the crystalline portion of the mercerized cellulose pulp.

1                   29.     The method of claim 1, wherein the mercerized and recovered  
2 cellulose pulp has a total crystallinity of less than about 60% by weight, based on 100%  
3 weight of total cellulose pulp.

1                   30.     The method of claim 1, wherein step (b) comprises converting the  
2 mercerized cellulose pulp into the cellulose ethers via a cellulose floc intermediate.

1                    31.     The method of claim 30, wherein step (b) comprises:  
2                                    (i)     treating the mercerized and recovered cellulose pulp  
3     to form a cellulose floc;  
4                                    (ii)    alkalating the cellulose floc to form an alkali  
5     cellulose; and  
6                                    (iii)   etherifying the alkali cellulose to form the cellulose  
7     ethers.

1                    32.     The method of claim 31, wherein step (b)(i) comprises grinding,  
2     dicing, or shredding the mercerized cellulose pulp to form the cellulose floc.

1                    33.     The method of claim 31, wherein step (b)(ii) comprises treating the  
2     cellulose floc with an alkalating agent.

1                    34.     The method of claim 33, wherein the alkalating agent is an alkali  
2     metal hydroxide.

1                    35.     The method of claim 31, wherein step (b)(iii) comprises reacting the  
2     alkali cellulose with an etherification agent to form the cellulose ethers.

1                    36.     The method of claim 35, wherein the etherification agent comprises  
2     sodium monochloroacetate.

1                    37.     The method of claim 11, wherein step (b) comprises:  
2                                (i)     alkalating the cellulose floc to form an alkali  
3 cellulose; and  
4                                (ii)    etherifying the alkali cellulose to form the cellulose  
5 ethers.

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1                    38.    The method of claim 1, wherein the cellulose ether is a  
2    carboxymethyl cellulose.

1                    39.    The method of claim 1, wherein the cellulose ether is a methyl  
2    cellulose.

1                    40.    The method of claim 1, wherein the cellulose ether is a nonionic  
2    ether.

1                    41.    The method of claim 1, wherein the cellulose ether is an ionic ether.

1                    42.    A carboxymethyl cellulose ether prepared by the method of claim  
2    38.

1                    43.    A methyl cellulose ether prepared by the method of claim 39.

1                    44.    A nonionic cellulose ether prepared by the method of claim 40.

1                    45.    An ionic cellulose ether prepared by the method of claim 41.

1                    46.    A method of preparing cellulose floc comprising the steps of:  
2                    (a)    obtaining mercerized and recovered cellulose pulp, and  
3                    (b)    treating the mercerized pulp to form the cellulose floc,  
4    wherein the cellulose pulp is southern softwood kraft and the mercerized and recovered  
5    cellulose pulp is substantially free of cellulose III and has a TAPPI 230om-89 viscosity of  
6    at most 12 cP.

1                    47.    The method of claim 46, wherein the mercerized and recovered  
2    cellulose pulp has a TAPPI 230 om-89 viscosity less than 10.4 cP or greater than 11.2 cP.

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1                    55.        The method of claim 54, wherein the mercerized and recovered  
2        cellulose pulp has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-  
3        95 of greater than 4.0%.

1                    63.     The method of claim 62, wherein the mercerized and recovered  
2 cellulose floc has a TAPPI 230 om-89 viscosity less than 10.4 cP or greater than 11.2 cP.



1                   64.    The method of claim 63, wherein the mercerized and recovered  
2 cellulose floc has a TAPPI 230 om-89 viscosity less than 9.25 cP.

1                   65.    The method of claim 64, wherein the mercerized and recovered  
2 cellulose floc has a TAPPI 230 om-89 viscosity less than 8 cP.

1                   66.    The method of claim 62, wherein the mercerized and recovered  
2 cellulose floc has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-  
3 95 of greater than 2.3%.

1                   67.    The method of claim 66, wherein the mercerized and recovered  
2 cellulose floc has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-  
3 95 of greater than 3.0%.

1                   68.    The method of claim 67, wherein the mercerized and recovered  
2 cellulose floc has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-  
3 95 of greater than 5.0%.

1                   69.    The method of claim 62, wherein the mercerized and recovered  
2 cellulose floc has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-  
3 95 of greater than 1.3%.

1                   70.    The method of claim 69, wherein the mercerized and recovered  
2 cellulose floc has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-  
3 95 of greater than 2.0%.

1                   71.    The method of claim 70, wherein the mercerized and recovered  
2 cellulose floc has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-  
3 95 of greater than 4.0%.

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1                    72.     The method of claim 62, wherein the mercerized and recovered  
2     cellulose floc has not been prehydrolyzed.

1                    73.     The method of claim 62, wherein the mercerized and recovered  
2     cellulose floc has not been bleached with elemental chlorine.

1            74.    A cellulose floc prepared by the method of claim 62.

75. A method of preparing cellulose ethers comprising the steps of:

- (a) selecting a desired viscosity for the cellulose ethers;
- (b) obtaining mercerized and recovered cellulose pulp having the appropriate viscosity for yielding cellulose ethers having the selected viscosity; and
- (c) converting the mercerized and recovered cellulose pulp to the cellulose ethers,

wherein the mercerized and recovered cellulose pulp is substantially free of cellulose III, the cellulose pulp is southern softwood kraft, and the mercerized and recovered cellulose pulp has a TAPPI 230 om-89 viscosity of at most 12 cP.

1                    76.     The method of claim 75, wherein when the cellulose ether prepared  
2     is hydroxyethyl cellulose, the mercerized and recovered cellulose pulp has a TAPPI 230  
3     om-89 viscosity less than 10.4 cP or greater than 11.2 cP.

1                    77.     The method of claim 75, wherein the mercerized and recovered  
2     cellulose pulp has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-  
3     95 of greater than 2.3%.

1                    78.     The method of claim 77, wherein the mercerized and recovered  
2     cellulose pulp has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-  
3     95 of greater than 3.0%.

1                    79.     The method of claim 78, wherein the mercerized and recovered  
2 cellulose pulp has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-  
3 95 of greater than 3.0%.

1                    80.     The method of claim 75, wherein the mercerized and recovered  
2 cellulose pulp has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-  
3 95 of greater than 1.3%.

1                    81.     The method of claim 80, wherein the mercerized and recovered  
2 cellulose pulp has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-  
3 95 of greater than 2.0%.

1                    82.     The method of claim 81, wherein the mercerized and recovered  
2 cellulose pulp has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-  
3 95 of greater than 4.0%.

1                    83.     The method of claim 75, wherein the mercerized and recovered  
2 cellulose pulp has not been prehydrolyzed.

1                    84.     The method of claim 75, wherein the mercerized and recovered  
2 cellulose pulp has not been bleached with elemental chlorine.